EPA Region 7 TMDL Review

TMDL ID	235	*Water Body ID*	MoWBID 0912
Water Body Name	Davis Creek		
Pollutant	BOD and Ammonia		
Tributary			
State	MO	*HUC*	10300104-060001
Basin			
Submittal Date	6/20/2003		
Approved	yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

Letter formally submitting these TMDLs received June 20, 2003. MDNR subsequently revised the TMDLs based on comments received from MDNR's NPDES permitting group and the revised TMDL document was received by EPA via email July 14, 2003.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

TMDLs for ammonia and BOD5 in Davis Creek were originally developed by MDNR and approved by EPA in 2001 due to low dissolved oxygen (DO) in Davis Creek. The TMDLs addressed in this decision document are revisions to the original TMDLs due to new data and information on nutrient impacts to the stream ecology, and the upgrade of the wastewater treatment plant (WWTP) from a lagoon facility to a mechanical plant. Allocations for ammonia are established at seasonal levels and are linked directly to the temperature and pH dependent numeric criteria for ammonia as written in the Missouri water quality standards (WQS). Allocations for BOD5 in the 2001 TMDL were established using the QUAL2E model based upon a lagoon system as the treatment technology;

allocations for BOD5 have been further reduced for the WWTP based upon best professional judgement in regards to the performance of a mechanical plant treating BOD5. In addition to restricting loads from the WWTP, reduction in nutrient loads and physical improvements may be needed to achieve the in-stream DO criteria, however, those targets will be identified in phase 2 of this TMDL after the major upgrade to the WWTP has occurred and the QUAL2E model has been recalibrated to more accurately reflect the attained in-stream water quality. Additional targets of biological index scores will further define benefits in reductions of ammonia and BOD5 and will help in guiding the target nutrient reductions in phase 2 to assure water quality standards (WQS) are attained.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

The beneficial uses of Davis Creek are described, as well as the narrative and numeric criteria for those beneficial uses. The impairment is low DO and the DO criterion was originally translated into a BOD5 numeric target of 45 mg/L, based upon the lagoon wastewater treatment. BOD5 is further reduced in this TMDL to 10 mg/L in anticipation of treatment performance expected with the upgrade of the lagoon to a mechanical plant. The numeric seasonal ammonia targets are taken directly from the temperature and pH dependent water quality criteria found in the Missouri water quality standards. The TMDL also provides for assessment endpoints using Missouri's macroinvertebrate Biological Index (BI) in order to fully assess support of the aquatic life use.

Link Between Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

The single point source contribution of BOD5 has been restricted to effluent quality more stringent than EPA Secondary Treatment Standards for 5-day BOD. The numeric ammonia seasonal targets are taken directly from the temperature and pH dependent water quality criteria found in the Missouri water quality standards. The stream response to the plant upgrade as measured through physical and chemical parameters, and the BI, will help guide nutrient targets in phase 2.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

The sources of BOD5 and ammonia are described. The major contribution was determined to be the Odessa Southeast Lagoon System. The non-point sources are described; livestock impacts and a degraded riparian zone are indicated to be major

influences on the quality of the stream. The submittal demonstrates that all significant sources of BOD5 and ammonia were identified and considered.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

For the point source allocation, the numeric ammonia seasonal targets are taken directly from the temperature and pH dependent water quality criteria found in the Missouri water quality standards. Potential non-point source loads will be assessed during this phase 1 of the TMDL; phase 2 will identify any needed reductions and allocations in any non-point source load.

WLA Comment

The waste load allocation (WLA) for BOD5 is 84 pounds/day, for ammonia the WLA is 17 pounds/day summer, and 28 pounds/day winter.

LA Comment

The load allocation (LA) for ammonia is zero. The LA for BOD5 is to be determined in phase 2 of the TMDL based on a calibrated model for the upgraded plant, additional sampling of the stream, and an assessment of the cause of the depressed dissolved oxygen if it is still a problem after the plant upgrade.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

An implicit margin of safety is based on the conservative assumption that multiple endpoints are used to confirm not only the numeric criteria for the stream have been attained, but the ecological system is fully supported as demonstrated by the BI scores.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

Seasonal variation is accounted for in the use of summer and winter ammonia limits. Because the major source is a WWTF, which has constant discharge rates, the critical condition is the 7Q10 low flow condition.

Public Participation

Submital describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

Public participation included six public meetings and a public notice for the original TMDL approved by EPA in 2001. The revised TMDL was again public noticed April 28th to May 28th, 2003. The public comments and Missouri's response to the comments are on file with MDNR.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

These are phased TMDLs, and a monitoring plan is included. Permit requirements will include sampling the effluent weekly for BOD5, pH, temperature and NH3-N. Phase 1 ambient monitoring upstream and downstream of the outfall will collect nitrogen, phosphorus, and dissolved oxygen samples and other information necessary to calibrate the QUAL2E water quality model and to assess nutrient loads from the watershed. Biological monitoring in accordance with Missouri's SOP will be conducted after the plant upgrade to determine compliance with the targeted BI scores identified in this TMDL.

Reasonable assurance

Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.

Assumptions were made which depend on reductions in the load allocation from non-point sources (NPS) when developing the WLA for the permitted WWTF. Therefore, reasonable assurance that NPS contributions will be reduced are necessary for this TMDL. If WQS are not attained after the WWTF is upgraded to a mechanical plant, the City of Odessa will enter into an agreement with MDNR, outside of the NPDES permitting process, which will define the actions the City should pursue to ensure best management practices are implemented to assure attainment of WQS in Davis Creek.